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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/501,333	07/23/2004	Naoto Ohta	256241US0PCT	9835
22850 7590 08/07/2009 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER				
BEST, ZACHARY P				
ART UNIT		PAPER NUMBER		
1795				
NOTIFICATION DATE		DELIVERY MODE		
08/07/2009		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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## Office Action Summary

**Application No.**

10/501,333

**Applicant(s)**

OHTA ET AL.

**Examiner**

Zachary Best

**Art Unit**

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 16 April 2009.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1, 5 and 8-32 is/are pending in the application.  
4a) Of the above claim(s) 22-27 is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1, 5, 8-21 and 28-32 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO/S508)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application  
6) ☐ Other: \_\_\_\_\_

**NEGATIVE ELECTRODE MATERIAL FOR  
LITHIUM ION SECONDARY BATTERY**

Examiner: Z. Best    S.N. 10/501,333    Art Unit: 1795

**DETAILED ACTION**

1. Applicant's amendment filed April 16, 2009 was received. Claims 29-32 were newly added. Claims 1, 5, 8-21, and 28-32 are currently pending examination.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

***Claim Rejections - 35 USC § 112***

3. The rejections under 35 U.S.C. 112, first paragraph of Claims 13-20 are withdrawn because independent Claim 13 was amended.

***Claim Rejections - 35 USC § 102 / 103***

5. The Claims 1, 5, 8-12, 21, 29, and 31 are rejected under 35 U.S.C. 102(e) as being anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Yoon et al. (U.S. Patent No. 6,596,437 B2).

Regarding Claims 1, 5, 8-10, 29, and 31, Yoon et al. teach an anode material for a lithium ion secondary battery comprising a coated graphite powder coated with a carbonized material of thermoplastic resin as a raw material (see claim 1) with an average particle size

between 10-50  $\mu\text{m}$  (see col. 5, lines 22-23), wherein the peak strength ratio ( $I_{360}/I_{580}$ ) is 0.4 or less (see col. 5, lines 39-42). It is the Examiner's position that the other properties of the anode material of Yoon et al., such as the interior pore portions, mesopore volume, standard deviation of particle size, rate of oxidation loss, specific surface area, H/C value, L(112) spacing, accumulative pore volume difference, change in mesopore volume due to coating, irreversible capacity, and initial efficiency are inherent given that the anode material of Yoon et al. and the present application have similar process steps, the peak strength ratios ( $I_{360}/I_{580}$ ), interlayer spacings  $d_{002}$ , and precursor materials. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999).

Alternatively, it would have been obvious to one of ordinary skill in the art at the time the invention was made to adjust the mesopore volume, cumulative pore volume difference, and change in mesopore volume due to coating to by changing the thickness of the coating in order to resist a lowered battery capacity due to electrolyte penetration (see Yoon et al., col. 5, lines 43-56).

Regarding Claim 8, Yoon et al. teach the interlayer spacing  $d_{002}$  of the core graphite between 0.335-0.342 nm (see col. 5, lines 37-40).

Regarding Claim 11, Yoon et al. teach the coated graphite powder is coated with carbonized material of thermoplastic resin of a carbonization yield of 10-20% (see Example

1 and Example 3), and Yoon et al. teach the ratio of thermoplastic to graphite powder (see Example 1 and Example 3).

Regarding Claim 12, Yoon et al. teach the thermoplastic resin may be polyvinyl alcohol (see claim 4).

Regarding Claim 21, Yoon et al. teach the anode material as recited above. It is noted that Claim 21 is a product-by-process claim. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed.Cir. 1985). The battery taught by Yoon et al. anticipates or is obvious to that of Applicant's, and therefore, Applicant's process is not given patentable weight in this claim.

### ***Claim Rejections - 35 USC § 103***

6. Claims 13-20, 28, 30, and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoon et al (U.S. Patent No. 6,596,437 B2) in view of Aihara et al. (JP 2001-196097).

Regarding Claims 13-18, 30, and 32, Yoon et al. teach an anode material for a lithium ion secondary battery comprising a coated graphite powder coated with a carbonized material of thermoplastic resin as a raw material (see claim 1) with an average particle size between 10-50  $\mu\text{m}$  (see col. 5, lines 22-23), wherein the peak strength ratio ( $I_{360}/I_{580}$ ) is 0.4 or less (see col. 5, lines 39-42). It is the Examiner's position that the other properties of the anode material of Yoon et al., such as the interior pore portions, mesopore volume, standard

deviation of particle size, rate of oxidation loss, specific surface area, H/C value, L(112) spacing, accumulative pore volume difference, change in mesopore volume due to coating, irreversible capacity, and initial efficiency are inherent, given that the anode material of Yoon et al. and the present application have similar process steps, the peak strength ratios ( $I_{360}/I_{580}$ ), interlayer spacings  $d_{002}$ , and precursor materials. A reference which is silent about a claimed invention's features is inherently anticipatory if the missing feature is necessarily present in that which is described in the reference. Inherency is not established by probabilities or possibilities. *In re Robertson*, 49 USPQ2d 1949 (1999). However, Yoon et al. fail to disclose a coated graphite powder as a mixture of two different kind of coated graphite powders in average particle size from each other.

Aihara et al. teach an anode material for a lithium ion secondary battery comprising graphite powder (section 0122) where the graphite powder is a mixture of two different kinds of graphite powders different in average particle size from each other (section 0123). Aihara et al. further teach that the ratio of average particle sizes is 0.3 (section 0123). Therefore, one graphite powder having an average particle size of 25  $\mu\text{m}$  will be mixed with another graphite powder having an average particle size of approximately 8  $\mu\text{m}$  (7.5  $\mu\text{m}$ ). The mixture of two different kinds of graphite powders as taught by Aihara et al. would be advantageous because of increased discharge capacity and discharge cycle properties (section 0028). Alternatively, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adjust the filling factor of the two different kinds of graphite powders by changing average particle size of the two different kinds of graphite powder

because Aihara et al. teach the discharge capacity per unit volume can be varied depending on the filling factor of the anode material. (sections 0109-0111, see also drawing 41).

Discovery of an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272 (CCPA 1980). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to make an anode material for a lithium ion secondary battery of Yoon et al. with the mixture of two different kinds of graphite powders different in average particle size from each other because Aihara et al teach resultant increase in discharge capacity and discharge cycle properties due to variation of the filling factor.

Regarding Claim 19, Yoon et al. teach the coated graphite powder is coated with carbonized material of thermoplastic resin of a carbonization yield of 10-20% (see Example 1 and Example 3), and Yoon et al. teach the ratio of thermoplastic to graphite powder (see Example 1 and Example 3).

Regarding Claim 20, Yoon et al. teach the thermoplastic resin may be polyvinyl alcohol (see claim 4).

Regarding Claim 28, Yoon et al. in view of Aihara et al. teach the anode material as recited above. It is noted that Claim 28 is a product-by-process claim. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. *In re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed.Cir. 1985). The battery taught by Yoon et al. in view of Aihara et al. is obvious to

that of Applicant's, and therefore, Applicant's process is not given patentable weight in this claim.

### ***Response to Arguments***

7. Applicant's arguments filed on March 26, 2008 have been fully considered, but they are not persuasive.

*Applicant argues:*

*(1) The exhibition of different interlayer spacings between the claimed invention and the prior art exhibits that the fine pores of Yoon et al. are not coated with resin;*

*(2) Yoon et al. do not create a material exhibiting the irreversible capacities or initial efficiencies as claimed.*

In response to Applicant's argument:

(1) Examiner appreciates the Declaration by Naoto Ohta regarding the comparison of the coated graphite powders of the present invention made by dry-blending, and the graphite powder prepared by the process of Yoon et al., Example 1. At the outset it is unclear as to the type of phenol resin used in the experimentation of Example 1, especially given that polyvinyl alcohol is one of the claimed limitations. Even largely assuming that polyvinyl alcohol was used, Examiner is not convinced with the logical assumption that a showing of the difference in average interlayer spacing equates to the presence or not of resin coated interior portions of the fine pores. Applicant's specification does not correlate



interlayer spacing with the presence of resin coated interior portions of the fine pores, and neither does the aforesaid Declaration. Examiner would be willing to consider evidence of a difference of mesopore volume defined by IUPAC as calculated with the BJH method or mercury porosimeter method as illustrated in the instant specification (pg. 12), which clearly correlates the presence of the resin coated interior portions of the fine pores.

Applicant further argues that "evenly covering the crystalline carbon core" according to Yoon et al. (col. 3, lines 25-33) precludes the inclusion of precursor resin material in to the pores of the graphite material. Examiner believes that during the mixing step of Yoon et al. the precursor material will incorporate in to the pores of the graphite because of the viscosity and surface energy of a polyvinyl alcohol dissolved in a low viscosity and surface energy organic solvent, such as tetrahydrofuran. It is further believed that the inclusion step occurs during the heating (melting) of the precursor material, which both Yoon et al. and the instant specification provide, as the instant specification is silent as to the inclusion step occurring during the dry-blending step.

(2) The examples in Yoon et al. are merely indicative of the possibilities of the irreversible capacity and initial efficiencies. For example, Yoon et al. does not provide an example using a polyvinyl alcohol resin, and it is unclear as to the exact specifications of the graphite powder used. It is also noted that while Aihara et al. do not discuss irreversible capacities and initial efficiencies, the instant specification shows that the use of the two different graphite powders gives a marked increase in irreversible capacities and initial efficiencies. It is believed that with routine experimentation with the materials presented by

Yoon et al., and further in view of the teachings of Aihara et al., the aforesaid claimed limitations would be inherent.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zachary Best whose telephone number is (571) 270-3963. The examiner can normally be reached on Monday to Thursday, 7:30 - 5:00 (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dah-Wei Yuan can be reached on (571) 272-1295. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

zpb

/Dah-Wei D. Yuan/  
Supervisory Patent Examiner, Art Unit 1795